

What is claimed is:

1. A control and signaling interworking function (CS-IWF) complex for use within a voice trunking over ATM (VTOA) system including an ATM network comprising a plurality of ATM switches, and a plurality trunk interworking functions (T-IWFs), and for use with a plurality of mated signaling transfer points (STPs), the CS-IWF complex comprising:

a plurality of CS-IWF units connected to at least two of the ATM switches and connected to at least one of the signaling transfer points, each unit having a plurality of processors with at least one processor compensating for a failed processor, at least one CS-IWF unit compensating for a failed CS-IWF unit;

wherein the at least one processor compensating for the failed processor cooperates with the at least one CS-IWF unit compensating for the failed CS-IWF unit so that the CS-IWF complex survives simplex failures.

2. The CS-IWF complex of claim 1, further comprising a plurality of signaling link sets, each link set connecting the CS-IWF complex to one of the mated STPs.

3. The CS-IWF complex of claim 2, further comprising a plurality of signaling gateways that connect to each of the plurality of CS-IWF units, each signaling gateway connecting to one of the mated STPs, wherein the plurality of signaling gateways minimize isolation of the CS-IWF units when a link failure occurs.

4. The CS-IWF complex of claim 1, further comprising a plurality of ATM links that connect each CS-IWF unit to a plurality of ATM switches.

5. The CS-IWF complex of claim 1, in which the plurality of processors operate in an active/standby mode.

6. The CS-IWF complex of claim 1, in which the plurality of processors operate in a load sharing mode.

7. The CS-IWF complex of claim 1, in which at least one of the plurality of CS-IWFs is located in a building separate from a building housing at least one other of the plurality of CS-IWFs.

5 8. The CS-IWF complex of claim 1, further comprising a single point code identifying the CS-IWF complex;

9. An end office building for interaction with a VTOA system including an ATM network comprising a plurality of ATM switches, and at least one control and signaling interworking function complex, the end office building comprising:

10 a plurality of T-IWFs, each T-IWF having a plurality of processors with at least one processor compensating for a failed processor, at least one T-IWF absorbing at least a portion of a failed T-IWF's workload; and

a switch that distributes calls among the plurality of T-IWFs in a load sharing manner,

15 wherein the at least one processor compensating for the failed processor cooperates with the at least one T-IWF absorbing at least a portion of the failed T-IWF's workload so that the end office building survives simplex failures.

10. The end office building of claim 9, further comprising at least one add/drop multiplexor (ADM) that connects the plurality of T-IWFs to the ATM network.

20 11. The end office building of claim 10, wherein each T-IWF further comprises an optical interface for connecting to the ADM, the optical interface supporting SONET 1+1 automatic protection switching.

25 12. The end office building of claim 9, in which at least one T-IWF connects to a first ATM switch that is different from a second ATM switch to which another T-IWF connects, wherein each end office building connects to a plurality of ATM

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switches so that if one ATM switch fails, the end office building remains connected to the ATM network.

13. A method for recovery from a failing ATM link in a VTOA system including an ATM network comprising a plurality of ATM switches interconnected by ATM links, a plurality of T-IWFs, and at least one CS-IWF complex, the method comprising:

delaying recovery action in the ATM network for a predetermined duration while SONET recovery of the link is attempted,

wherein if the SONET recovery is successful, a call path through the ATM network stays up, and

wherein if the SONET recovery is unsuccessful, existing calls carried by the failed ATM link are dropped.

14. The method of claim 13, wherein the predetermined duration is 100 milliseconds.

15. A switch management system (SMS) for use within a VTOA system including an ATM network comprising at least one ATM switch, a plurality of T-IWFs, and at least one CS-IWF complex, the switch management system comprising:

a plurality of switch management system units, at least one of the switch management system units comprising a backup unit for at least one primary switch management system unit, each switch management system unit providing application redundancy within itself, whereby the switch management system survives simplex failures.

16. The SMS of claim 15, in which the primary switch management system unit is located in a building separate from a building housing the backup switch management system unit.

17. The SMS of claim 15, in which each switch management system unit is connected to a plurality of ATM switches.

18. A method of restoring functions of a failed switch management system operating within a VTOA system including an ATM network comprising a plurality of ATM switches, a plurality of T-IWFs, and at least one CS-IWF complex, the method comprising:

restoring essential surveillance of the VTOA system;  
restoring billing functions of the VTOA system;  
restoring full surveillance capability of the VTOA system;  
restoring configuration management of the VTOA system; and  
restoring performance management of the VTOA system.

19. A VTOA system communicating with a plurality of mated signaling transfer points, the VTOA system comprising:

an ATM network comprising a plurality of interconnected ATM switches;  
at least one CS-IWF complex comprising a plurality of CS-IWF units connected to at least one of the ATM switches and connected to at least one of the signaling transfer points, each unit having a plurality of processors;

at least one end office building comprising a plurality of T-IWFs, each T-IWF having a plurality of processors, and a switch that distributes calls among the plurality of T-IWFs in a load sharing manner; and

a switch management system comprising a plurality of switch management system units, at least one of the switch management system units comprising a backup unit for at least one primary switch management system unit, each switch management system unit providing application redundancy within itself,

wherein the VTOA system survives simplex failures.

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20. The system of claim 19, in which the ATM network further comprises at least two completely disjointed routes between any two end points.

21. A method for communicating over a VTOA system including a CS-IWF complex, and a plurality of T-IWFs, which reside within a plurality of end office buildings each housing a switch, and an ATM network comprising a plurality of ATM switches, the method comprising:

transmitting a signal from the switch to the plurality of T-IWFs in a load sharing manner; and

transmitting from the T-IWFs to the ATM switches in a load sharing manner; wherein the communication survives a simplex failure in the VTOA system.